REMARKS

Reconsideration of the present application is respectfully requested in light of the above amendments to the application and the following remarks.

Regarding the Claims

Claims 1-5 have been amended, Claim 33 has been canceled and new Claim 34 has been added. Currently pending in the application, therefore, are Claims 1-32 and 34. No new matter has been added.

Claims 1-33 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Huang et al. (U.S. Patent No. 6,277,168 "Huang") in view of Bjorkman (U.S. Patent No. 4,268,306 "Bjorkman"). Huang discloses a method for smelting, i.e., refining metal ore, not coal ash. Huang uses microwave energy to melt, not volatilize mercury. "The slag and the refractory material continue to absorb microwave energy and maintain an elevated temperature while metal and slag separate. After the separation of the molten metal and slag, the microwave generator is turned off, and the molten mass is allowed to cool" (col. 6, lines 25-30). "Due to the specific density differences, the molten metal droplets descend to form a molten pool 211 at the bottom of the vessel and the slag 210 floats on the top of the molten metal" (col. 6, lines 20-23). As seen in Fig. 2 of Huang, gas comes in at the top (inlet 205) and exits at the top (outlet 204) of the vessel 201. Huang does not disclose that the gas entering through outlet 204 contains any significant fraction or portion of metal (e.g., mercury). Huang's process is designed to recover a liquid/molten material, not a vapor. The material to be recovered is sedimented out at the bottom of the bed. Further, Huang is not designed to flush material out of a bed of raw material using a gas. Huang is designed to separate liquid material, not purging volatile material.

Bjorkman discloses a method for volatilizing mercury in a vacuum chamber using a complex set of vacuum chambers and pressurization, using vacuum distillation. The method appears to involve pressurizing then depressurizing the vessel, causing the mercury to migrate. Bjorkman appears to be a batch process, not continuous and not continuous batch. For each new batch the vessel must be charged and pressurized with the contents isolated from other material. A series of steps are needed to make one batch (see col. 3, line 19-22: "...after which the cycle is repeated several times per hour...The sequencing disclosed above can readily be instrumented as follows..." [emphasis added]). In other words, once the cycle is started no new material can enter the vessel without breaking the vacuum maintained during the processing of the particular batch. Furthermore, Bjorkman purges the reaction vessel with nitrogen, an inert gas.

In contrast the invention as presently claimed provides a batch or continuous flow method in which mercury is volatilized after heating by microwave energy from a bed of initial material through which a gas stream (3) (see Fig. 1 of the present application) is passed. The gas contains volatilized mercury (and other material) and is removed as a vapor or gas via an outlet (5). New material can enter the reaction vessel on a continuous basis. "Material being fed into the reactor vessel is continuously removed, for example by means of an overflow discharge pipe (6)..." "paragraph 0035). The continuous nature of the present invention provides improved efficiency and profitability. Furthermore, the present invention does not require the use of an inert gas.

To establish *prima facie* obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. *In re Roy*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.P.A. 1974).

> When an obviousness determination is based on multiple prior art references, there must be a showing of some "teaching, suggestion, or reason" to combine the references.

> Gambro Lundia AB v. Baxter Healthcare Corp., 110 F.3d 1573, 1579, 42 USPQ2d 1378, 1383 (Fed. Cir. 1997) (also noting that the "absence of such a suggestion to combine is dispositive in an obviousness determination"). Whether motivation to combine the references was shown we hold a question of fact. See In re Dembiczak, 175 F.3d 994, 1000, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) ("[P]articular factual findings regarding the suggestion, teaching, or motivation to combine serve a number of important purposes . . . .") (emphasis added); Monarch Knitting, 139 F.3d at 881-83, 886, 45 USPQ2d at 1982, 1985 (treating motivation to combine issue as part of the scope and content of the prior art and holding that genuine issues of fact existed as to whether one of ordinary skill in the art would have been motivated to combine the references in question).
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> Evidence of a suggestion, teaching, or motivation to combine prior art references may flow, inter alia, from the references themselves, the knowledge of one of ordinary skill in the art, or from the nature of the problem to be solved. See Dembiczak, 175 F.3d at 999, 50 USPQ2d at 1617. Although a reference need not expressly teach that the disclosure contained therein should be combined with another, see Motorola, Inc. v. Interdigital Tech. Corp., 121 F.3d 1461, 1472, 43 USPQ2d 1481, 1489 (Fed. Cir. 1997), the showing of combinability, in whatever form, must nevertheless be "clear and particular." Dembiczak, 175 F.3d at 999, 50 USPQ2d at 1617.[1]

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention when there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 2221 U.S.P.Q. 929, 933 (C.A.F.C. 1984). Applicant respectfully submits that the Examiner has cited no motivation or suggestion in either reference to combine the two, nor could such reasonably be done because, while Bjorkman's vacuum distillation method does relate to mercury removal, the vacuum distillation method of volatilized material used is inapplicable Huang's smelting method of separating liquid material.

Applicant has clarified Claim 1 to reflect the proper location of gas stream introduction and also that the method of the present invention is capable of continuous processing of material. Therefore, Applicant respectfully submits that Claims 1-33 as amended are not obvious over the

[1] Quoted from WINNER INT'L. ROYALTY v WANG *No. 98\553 - 01/27/2000 (CAFC).*

combination of Huang and Bjorkman because a method for melting and smelting material to sediment out certain fractions, combined with the disclosure of the ability to remove mercury from solid waste would not present the novel solution of the present invention. Further, there is no motivation to combine a smelting process as in Huang with the vacuum distillation method of Bjorkman to obtain the continuous volatilization process of the present invention.

With respect to Claims 13-21, as discussed above, the simple addition of microwave energy claimed with respect to the novel process claimed in Claim 1 and is therefore not obvious in view of the general knowledge in the art which the Examiner alleges exists.

Further, Claim 33 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Tranquilla (U.S. Patent No. 6,074,533 "Tranquilla 533") and as being unpatentable over Tranquilla (U.S. Patent No. 5,824,133 "Tranquilla '133"). With regard to Claim 33, Applicant has canceled this claim, rendering the rejections moot.

New Claim 34 has been added to claim a continuous flow process.

Claims 1-32 as amended are believed to now be in condition for allowance, and new Claim 34 is thereby also in condition for allowance. Therefore, Applicant submits that the new and amended claims overcome the Examiner's rejections and objections and are in condition for allowance, and Applicant respectfully requests the same

Some amendments and remarks contained in this document, or in other documents filed or to be filed with the US Patent Office in this case or related cases, may in the future be deemed, by a court of law or government agency of competent jurisdiction, to be narrowing amendments and/or related to patentability. Accordingly, the public is hereby advised that the Applicant: (a) intends to relinquish only that claim coverage which is clearly, explicitly, precisely and

unequivocally stated to be relinquished; (b) does not intend to relinquish any other claim coverage; (c) reserves the right to assert that any such amendments and/or remarks are not narrowing and/or are not related to patentability; and (d) intends to fully assert the full range of equivalents, under the Doctrine of Equivalents and otherwise, which are presently known or which may become known in the future, for each and every element of each and every claim, and for each and every claim.

Should the Examiner have questions or suggestions which will put this application in line for allowance, he or she is requested to contact the undersigned attorney.

Respectfully submitted,

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